

# Meeting WISHA Training Requirements

- To meet the WISHA training requirements for Hazard Communication, you must include information specific to your worksite as indicated in Slides # [36](#), [37](#), [45](#) and [46](#).
- Preview this program and include your specific workplace information before conducting the training.
- It is recommended you keep an attendance roster for your records to document training.

# How to use this PowerPoint Program

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- Users with PowerPoint can download, edit, and use the program for training with a laptop and multimedia projector.
- Additional information is found in the Notes section of this presentation. You can read the text in quotations or use your own words.
- If you want to print out this program, the PDF file uses less computer memory and prints faster.



# Hazard Communication

**This training will cover the following:**

- What are hazardous chemicals,
- How do hazardous chemicals affect the body,
- what are the different types of hazardous chemicals,
- what is on product labels,
- what are material safety data sheets
- How to protect yourself from hazardous chemicals.

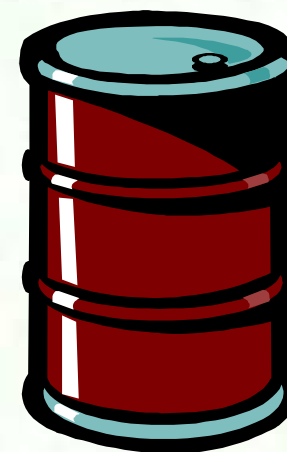
# Hazard Communication

## What is hazard communication?

Hazard communication or “hazcom” is our program where we tell you about the hazardous chemicals used in our workplace.

We will also train you on how to protect yourself from the effects of these hazardous chemicals.

Hazcom training is required by WISHA.



# Hazard Communication

## What is a “hazardous chemical”?

A hazardous chemical is any chemical that can do harm to your body.

Most industrial chemicals can harm you at some level.

It depends how much gets into your body.

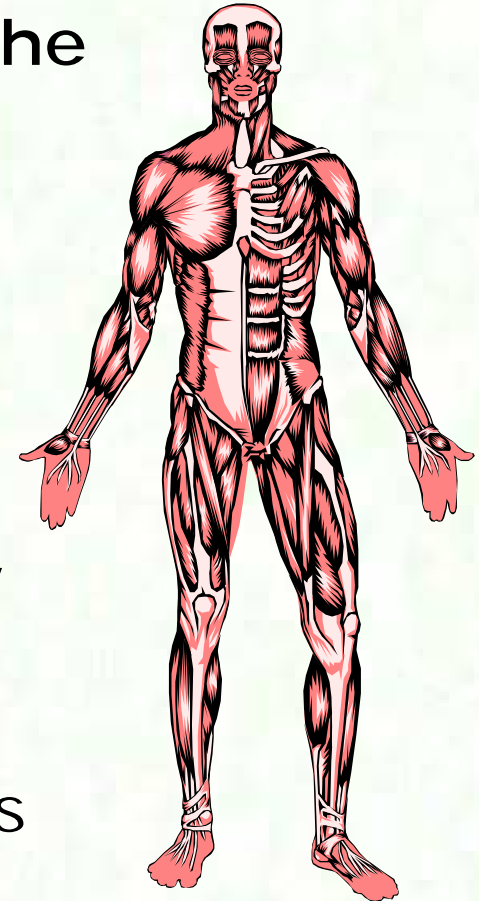


# Hazard Communication

## How do hazardous chemicals affect the body?

The effect a certain chemical has on the body depends on several factors:

- The physical form of the chemical
- How the chemical enters the body
- The amount of chemical that actually enters the body - the dose
- How toxic (poisonous) the chemical is



# Types of Chemicals

## The Three Forms of Chemicals

All chemicals exists in one of three forms:

Solid



Gas



Liquid





# Types of Chemicals

## Solids - Dusts

- Dust or powder can be released into the air by cutting, drilling, grinding or sanding and inhaled.



- Dust can also be stirred up by dry sweeping and inhaled.





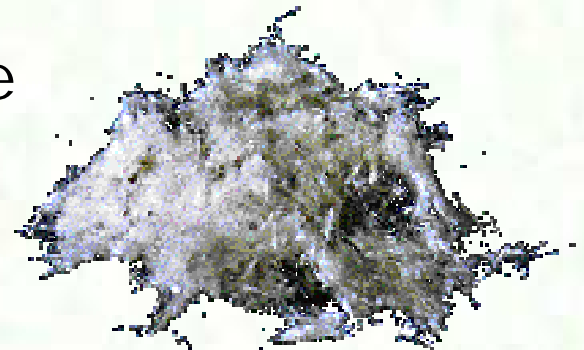
# Types of Chemicals

## Solids – Fumes and Fibers

- Fumes are extremely small droplets of metal formed when the metal has been vaporized by high temperatures (usually welding)



- Some compounds are fibers which can be similar to dusts but they have an elongated shape (like asbestos or fiberglass)



# Types of Chemicals

## Solids - Dust

- Dust in the air can settle out on work surfaces, cups, plates, utensils, and food.
- The settled dust can be swallowed with food or drinks.



# Types of Chemicals

## Liquids

- Liquids can come into direct contact with the skin and be absorbed into the body.
- Liquids can be sprayed and form mists or evaporate and form vapors which can be inhaled.



# Types of Chemicals

## Liquids (Mists)

- Mists can also be inhaled.
- Mists can settle on the skin and be absorbed.
- Airborne mists can also settle out and contaminate food or drink.



# Types of Chemicals

## Gases and Vapors

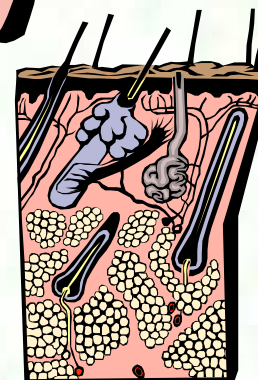
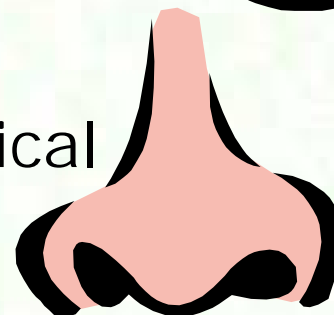
- Gases are chemicals that are in the gas phase at room temperature.
- Vapors evaporate from substances that are liquids or solids at room temperature.
- Gases and vapors enter the body by inhalation.



# How Chemicals Enter the Body

## There Are Three Routes of Entry:

- Ingestion – swallowing the chemical
- Inhalation – breathing in the chemical
- Absorption – the chemical soaks through the skin



# How Chemicals Enter the Body

## Ingestion (Swallowing)

- Chemicals that are swallowed are absorbed in the digestive tract.
- Chemicals can rub off dirty hands and contaminate food, drinks or tobacco products.
- Chemicals in the air can settle on food or drink and be swallowed.



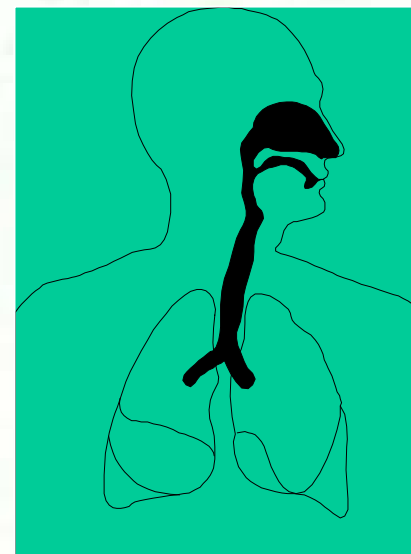


# How Chemicals Enter the Body

## Inhalation (Breathing)

Airborne chemicals are breathed in through the mouth or nose.

- The size of particles or droplets can affect where the chemical settles in the respiratory tract.
- Where the chemical settles in the respiratory tract determines what symptoms or diseases will develop.



# How Chemicals Enter the Body

## Skin Absorption



# Chemical Toxicity

## Toxicity: how poisonous are chemicals?

**Dose** - The effects of any toxic chemical depends on the amount of a chemical that actually enters the body.

**Acute Toxicity** - the measure of how toxic a chemical is in a single dose over a short period of time.

**Chronic Toxicity** – the measure of the toxicity of exposure to a chemical over a long period of time.



# Chemical Toxicity

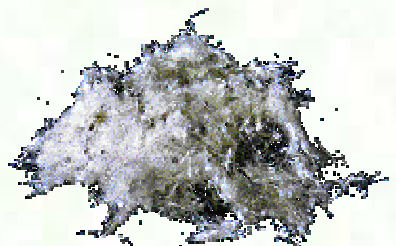
## Chronic Toxicity and Acute Toxicity

Some chemicals will only make you sick if you get an 'acute' or high dose all at once. **Example - ammonia**

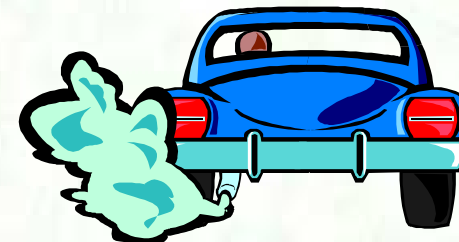


Some chemicals are mainly known for their chronic or long-term effects.

**Example - asbestos**



Most chemicals have both acute and chronic effects. **Example – carbon monoxide**



# Chemical Toxicity

## Chemical Exposure Limits

Many chemicals have exposure limits, or allowable amounts of a chemical in the air.

These limits are often called "PELs" or "TLVs".

They are based on 8-hour average exposure or ceiling or peak levels.

Levels must be kept below these limits for safety.

**PEL**

**example: 100 parts per million**

# Toxic Chemicals

## Carcinogens

Carcinogens are cancer-causing compounds.

Some chemicals are known human carcinogens, others are only suspected as carcinogens.

WISHA has regulations covering the general use of carcinogens, and has specific regulations for several known human carcinogens.

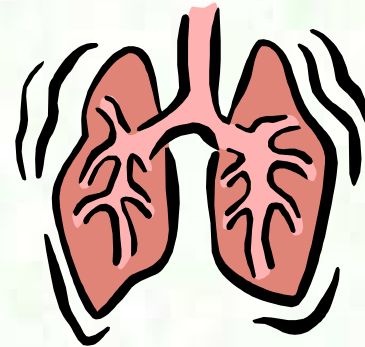


# Toxic Chemicals

## Carcinogens

WISHA and OSHA have specific regulations on the following carcinogens:

- Vinyl Chloride
- Acrylonitrile
- 1,2,-Dibromo-3-chloropropane (DBCP)
- Inorganic Arsenic
- Ethylene Oxide
- Cadmium
- Butadiene
- Methylene Chloride
- Benzene





# Toxic Chemicals

## Other Groups of Toxic Chemicals

### Teratogens

- Teratogens are compounds that can harm the developing fetus, causing birth defects or death.

### Mutagens

- Mutagens cause genetic mutations or changes. These mutations can cause birth defects or other problems in following generations or may lead to cancer in the exposed person.



# Toxic Chemicals

## Other Groups of Toxic Chemicals

### Sensitizers

- Sensitizers can “switch on” a reaction in an individual worker.
- The reaction to a sensitizer depends upon the individual worker.
- Once a worker becomes sensitized to a compound, smaller and smaller exposures can cause a reaction, and the reactions can become more severe.



# Corrosive Chemicals

## Corrosive Chemicals

- Acids and bases are common corrosive chemicals.
- Corrosive chemicals are capable of damaging skin, eyes and the respiratory system.



# Corrosive Chemicals

## Corrosive Chemicals - Skin

- Corrosives can cause visible skin burns or damage.



- The extent of skin damage depends on how long the corrosive is on the skin and how concentrated the corrosive is.



# Corrosive Chemicals

## Corrosive Chemicals – Inhalation and Eyes

- Inhalation of corrosive mists or vapors can cause severe bronchial irritation.



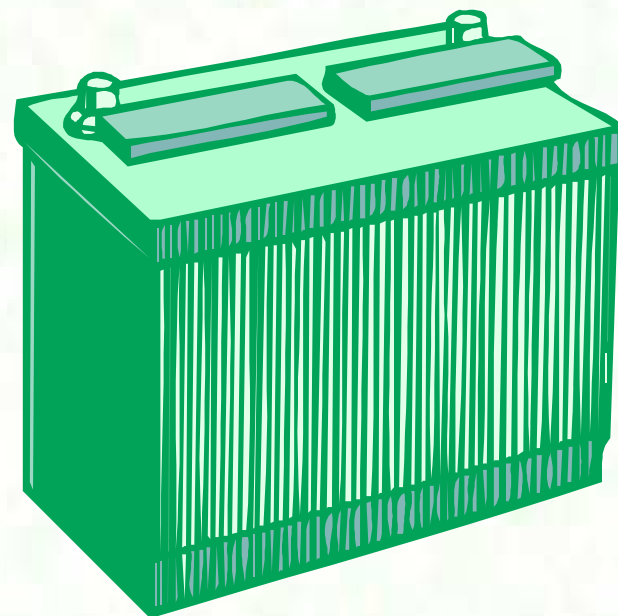
- Corrosives are especially damaging to the eyes.



# Corrosive Chemicals

## Examples of Corrosive Chemicals

- Sulfuric Acid
- Ammonia
- Chromic acid
- Phenol
- Acetic Acid
- Chlorine

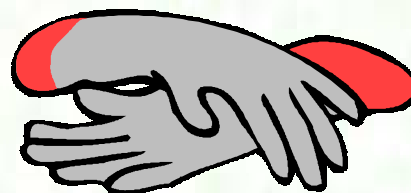


Batteries contain sulfuric acid

# Corrosive Chemicals

## Protection from Corrosives

Protective gloves & clothing



Goggles



Eyewashes



Water (for splashes on the skin)

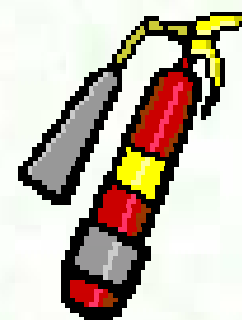




# Flammable Liquids

## Properties of Flammable Liquids

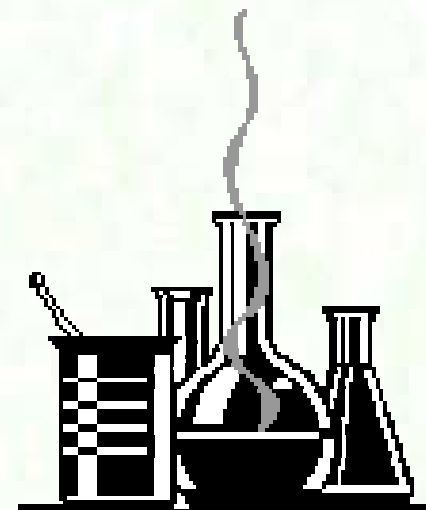
- The vapor of a flammable liquid ignites and causes fire or explosion – not the liquid itself.
- The flammability of a liquid depends on its physical properties:
  - Vapor Pressure
  - Flash Point
  - Limits of Flammability
  - Vapor Density



# Flammable Liquids

## Vapor Pressure

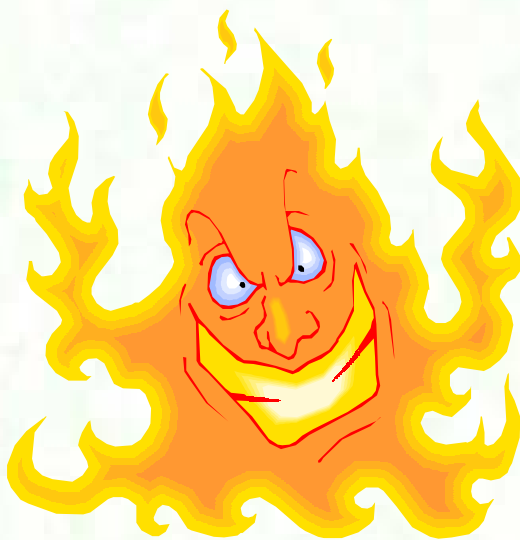
- Vapor pressure is a measure of how fast a liquid evaporates.
- The higher the vapor pressure the more rapidly the liquid will evaporate.
- Vapor pressure goes up and down with the temperature of the liquid.



# Flammable Liquids

## Flash Point

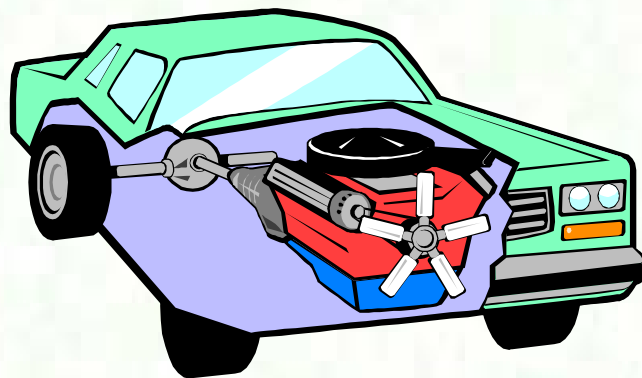
The flash point is the lowest temperature that a flammable liquid can generate enough vapor to form a mixture with air that will ignite.



# Flammable Liquids

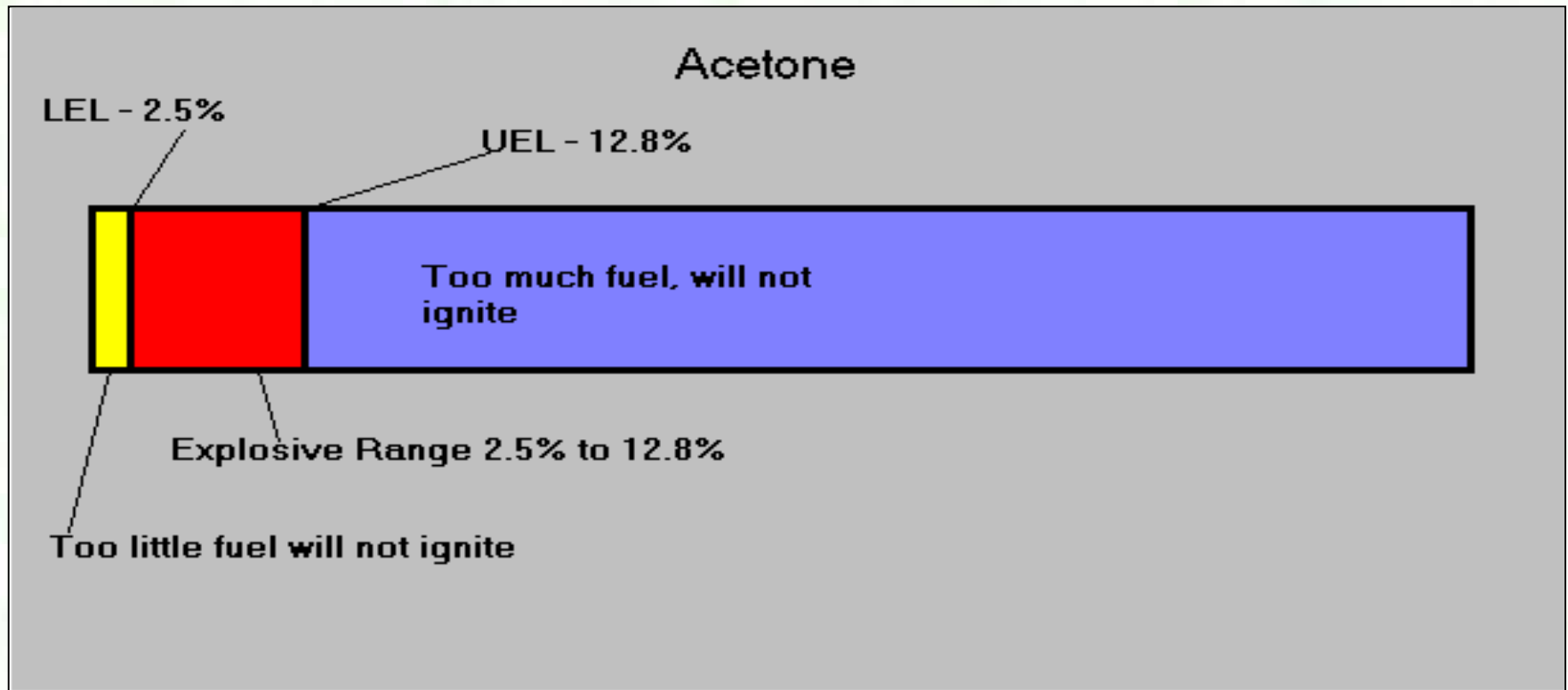
## Limits of Flammability

- The limits of flammability is the range that a mixture of air and vapor is flammable.
- Mixtures can be too lean (not enough vapor) or too rich (too much vapor) to ignite and burn.



# Flammable Liquids

## Flammable Limits Example



LEL – “lower explosive limit”

UEL – “upper explosive limit”

# Flammable Liquids

## Lower Explosive Limit – LEL

In most work situations, the “lower explosive limit” (LEL) is the main concern.

Vapors from flammable liquids can be found in the workplace, but are often too diluted to catch fire or explode.

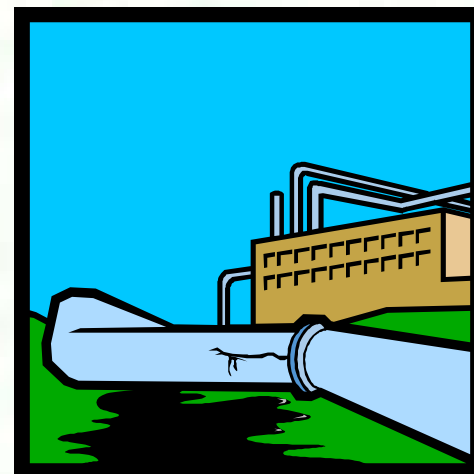
However, these vapors can quickly go above the LEL in small room or confined space like a tank.



# Flammable Liquids

## Vapor Density

- “Vapor density” is a measure of how heavy a vapor is compared to air.
- Vapors with a density greater than 1.0 are heavier than air and can collect near the floor, and “flow” like a liquid.
- This may create a fire/explosion hazard if the vapor flows to an ignition source.





# Metals

## Hazards of Metals

- Metals can be both physical hazards and health hazards.
- Some metals can ignite and explode – magnesium, or dusts/filings of other metals such as aluminum
- Some metals are almost non-toxic – iron, aluminum
- Others are very toxic – lead, cadmium, mercury, beryllium



# Training Break

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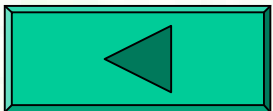
This slide can be used to take a break or divide this training into two sessions.

# Our Worksite Information



**The following operations or work areas  
is where hazardous chemicals are  
present:**

[List where hazardous chemicals are used]



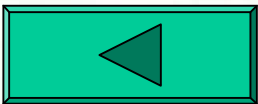
back

# Our Worksite Information



The following products are used at:

[list products and where used here]



back

# Getting Information

## How do you get information about hazardous chemicals?

You can get information two ways:

- from the product label,
- from the product material safety data sheet.



**MSDS**

# Getting Information

## What is on the product label?

- The manufacturer,
- The name of the product,
- a hazard warning,
- a list of hazardous ingredients



# Getting Information

## What is a material safety data sheet?

Material safety data sheets or “MSDSs” are information sheets on products that:

- tells what chemicals are in the product,
- what the hazards of the chemicals are,
- how to protect yourself from the hazards.





# Material Safety Data Sheet

## MATERIAL SAFETY DATA SHEET

Trade Name: **ACETONE**

Chemical Family: Acetone

Formula: C<sub>3</sub>H<sub>6</sub>O

Manufacturer:

Supplier:

Emergency Phone #'s

Transportation EMG. Phone #'s CANUTEC

### HAZARDOUS INGREDIENTS

ACETONE: 99% CAS # 67-64-1

Exposure limits, PPM: OSHA-PEL 750, ACGIH - TLV 750

LD50 Orla rat 9750 MG/KG, Skin rabbit 20 G/KG, LC50 rat 16000 PPM

### PHYSICAL DATA

Appearance & Odor: Clear colorless liquid, sweet odor

Vapor pressure: MM HG/20 DEG. c: 184

Vapor density: (AIR 1) 2.0

Solubility in water: 100%

Specific gravity: (Water = 1) 0.79

### FIRE AND EXPLOSION DATA

Flashpoint & Method: 0% F (TCC)

Flammable Limits: LFL 2.0, UFL 13.0

Extinguishing Media: water spray, dry chemical, CO<sub>2</sub>, alcohol foam

Special equip. & procedures: Self contained breathing apparatus & complete protective clothing. Acetone is extremely flammable, any source of ignition will ignite it. Vapor is extremely explosive.

### REACTIVITY DATA

Conditions Contributing to Instability: Heat, Sparks & Open Flame

Incompatible Substances: Acids, Oxidizing materials, Alkalis, Amines, Potassium T-Butoxide, Alkanolamines, Ammonia, Aldehydes, Chlorinated compounds.

Hazardous Decomposition Products: Carbon Monoxide, Carbon Dioxide

Hazardous Polymerization: will not occur.

## MATERIAL SAFETY DATA SHEET

### HEALTH HAZARDS DATA

**NOTE:** Health studies have shown that exposure to chemicals pose potential risks which may vary from person to person. Exposure to liquids, vapors, mists or fumes should be minimized.

### PRINCIPAL HEALTH HAZARDS

Skin contact: contact will dry skin, irritate skin, dermatitis

Eye contact: irritation and may burn eye

Ingestion: large quantities causes headaches, nausea, vomiting. Can also cause liver and kidney damage.

Inhalation: may cause headaches, nausea, vomiting, dizziness, other central nervous system effects, ( i.e. convulsions)

### FIRST AID PROCEDURES

Skin: Avoid direct contact with this chemical, wash with soap and water, seek medical attention if a rash persists.

Eyes: Flush with warm water for 20 minutes, obtain medical attention immediately.

Ingestion: If conscious, **immediately induce vomiting** by giving 2 glasses of water and sticking a finger down the throat. Get medical attention immediately.

Inhalation: Remove to fresh air. Give A/R if not breathing, get immediate medical attention.

### PREVENTATIVE MEASURES

Skin: Wear impervious gloves (butyl rubber), coveralls and safety footwear.

Eyes: Chemical proof goggles or full face respirator if vapors cause eye discomfort.

Ingestion: Wash thoroughly before consuming food stuffs.

Inhalation: Use only in well ventilated areas or use NIOSH approved respiratory protection with organic vapor cartridges.

### CONTROL MEASURES AND PRECAUTIONS

Keep container tightly closed. **DO NOT** consume food, drink or tobacco in work or material storage areas. **Flame or any source of ignition is to be kept away from this product.** Use caution and personal cleanliness to avoid skin and eye contact. Avoid breathing vapors.

### SPILL, LEAK AND DISPOSAL METHODS

**\*\* Review Fire and Explosion Hazards and Safety Precautions before proceeding with cleanup.** Restrict access to area. Remove all sources of ignition and ventilate area. Absorb spill with an absorbent material such as vermiculite or



# Material Safety Data Sheet

## MSDSs – what information do they have?

- Names of hazardous chemicals in a product, Acetone
- Physical and chemical properties of the product, Flammable & highly volatile
- Physical hazards of working with the product, Burns
- Health hazards of working with the product (including signs and symptoms of overexposures), Headaches, eye irritation

# Material Safety Data Sheet

## Material safety data sheets (continued)

- The main way the chemical enters the body,

Inhalation

- The legal limit allowed in the air

750 ppm

- If the chemical is a carcinogen

No

- Precautions for safe use of the hazardous chemical,

Use with adequate ventilation, keep away from open flame

# Material Safety Data Sheet

## Material safety data sheets (continued)

- Exposure control methods, including personal protective equipment,

Wear respirator,  
rubber gloves

- Emergency and first aid procedures,

Eyes: flush with  
water for 15 minutes

- The date the MSDS was prepared or revised,

1996

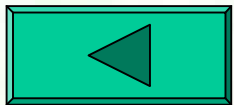
- Name, address and phone number of the person responsible for the information in the MSDS.

John Doe 1234  
Maple St.  
Anywhere, USA

# Our Worksite Information



Material Safety Data Sheets are located in the following locations, or contact [name] to see MSDSs



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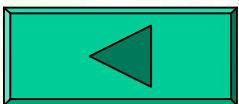
# Our Worksite Information



We have done air sampling in the following locations:



Results of this air sampling can be found at the following location:



back

# Protecting Yourself

**You can protect yourself from hazardous chemicals by:**

Knowing what is in the product your work with,



Using the smallest amount of a chemical to do the job,



Maintaining machinery and equipment to prevent leaks or releases,



# Protecting Yourself

Protect yourself from hazardous chemicals by:

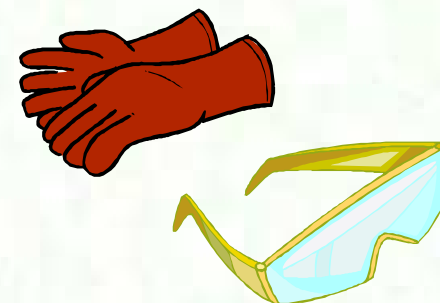
Using ventilation to reduce amounts of chemicals in the air,



Enclosing a chemical process as much as possible,



Wearing necessary personal protective equipment.



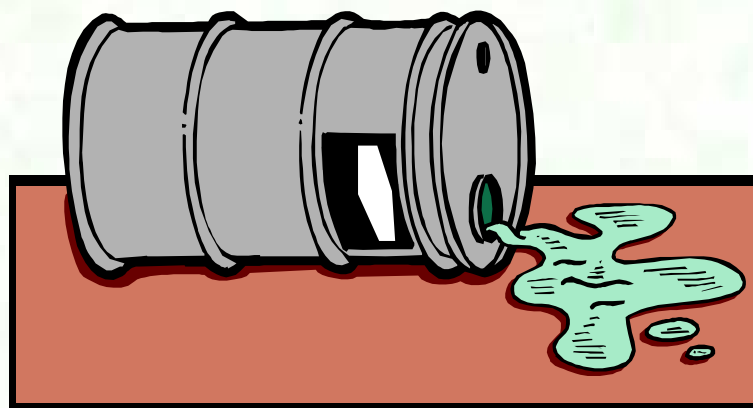
# Protecting Yourself

In the case of a leak or spill, protect yourself by:

Informing your supervisor of unusual odors, spills, or releases,



Leaving an area of a large spill or chemical release.





# Protecting Yourself

**If you have been exposed to a chemical  
and feel sick:**

Let your supervisor know,  
Find out what the chemical was,  
Follow the first aid directions in  
the MSDS,  
Get medical attention as  
needed,  
Check your PPE before going  
back to the area.



# Hazard Communication Quiz

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The following questions are optional. They can be used to check your employees understanding of this training and promote discussion. You can add more questions for a short written or verbal quiz.

# Hazard Communication Quiz

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## Question 1

What are the three routes of entry of chemicals into the body?

- a) Ears, eyes and mouth
- b) nose, mouth and skin
- c) swallowing, inhaling and drinking
- d) ingestion, inhalation and absorption

# Hazard Communication Quiz

## Question 2

What is acute toxicity of a chemical?

- a) a good-looking chemical
- b) the chemical is toxic only if you drink it
- c) the chemical will harm you only after years of exposure
- d) the chemical can harm you in a single dose over a short period of time

# Hazard Communication Quiz

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## Question 3

When is a chemical vapor flammable?

- a) Only if it is really hot
- b) Only when the amount is above the UEL
- c) When the amount in the air is above the LEL
- d) Whenever there is an open flame

# Hazard Communication Quiz

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## Question 4

How can you find out what chemical is in a product we use?

- a) Ask your supervisor
- b) Look on the label
- c) Read the MSDS
- d) ask your co-worker

# Hazard Communication Quiz

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## Question 5

What should you do if there is a large chemical spill in your work area?

- a) Run out of the building
- b) Leave the area and inform your supervisor and coworkers
- c) Clean it up right away
- d) Call 911